THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATION COUNCIL

DIPLOMA IN SECONDARY EDUCATION EXAMINATION

733/2A **BIOLOGY 2A**

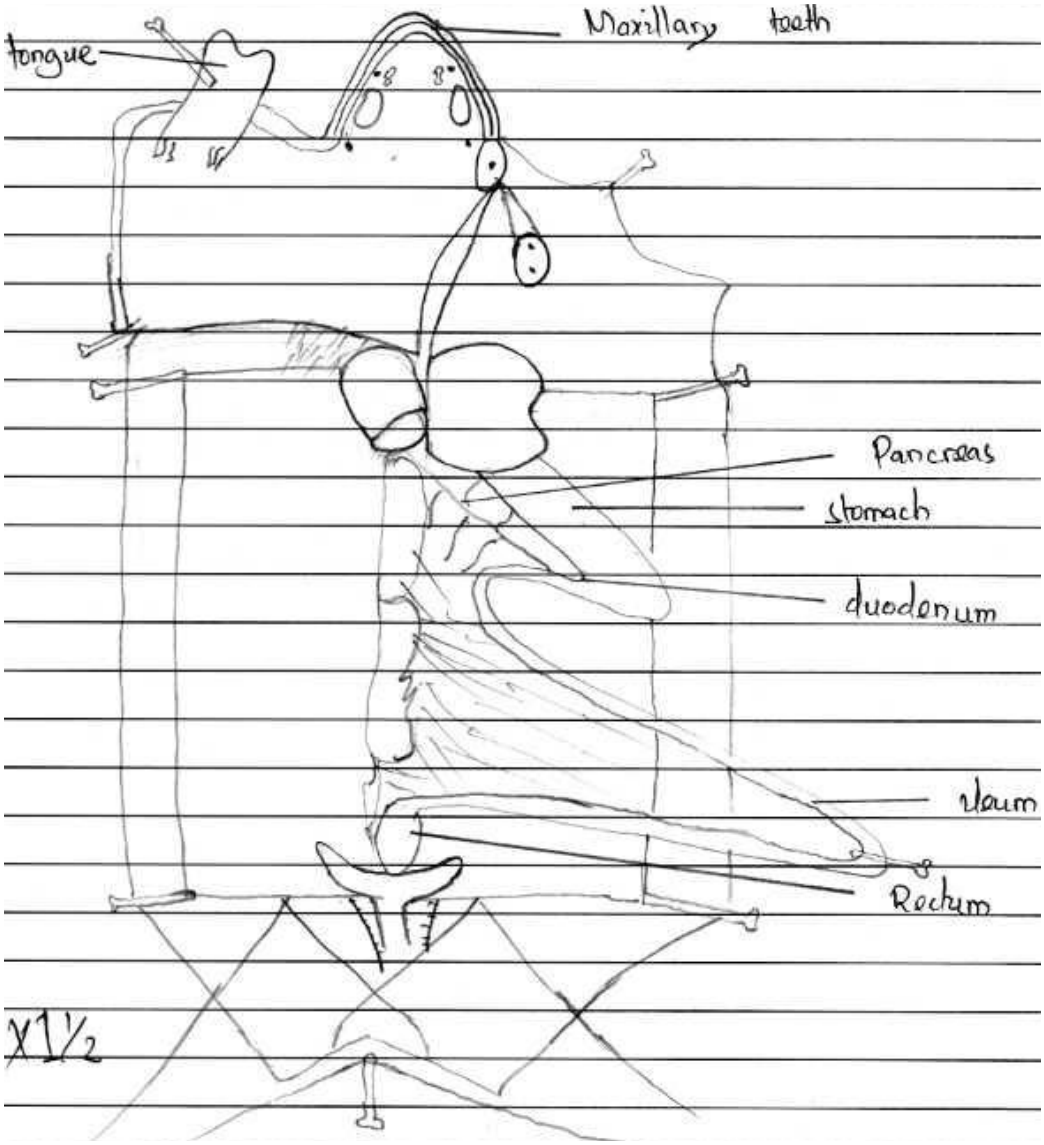
Time: 3 Hour. **ANSWERS** **Year: 2001**

Instructions

1. This paper has three papers.
2. Answer **all** questions.
3. Question **1** contains 30 marks while question 2 and 3 have 10 marks each.
4. Mobile phones are not allowed inside the examination room.
5. Write your Examination Number on every page of your answer booklet.

1. Dissect the provided specimen J (a male or female grass frog) in the usual way to expose the reproductive system. Then respond to the following:

(a) Draw a well labelled diagram of the dissected specimen J showing four parts of the reproductive system.



(b) Identify the organ responsible for the following functions:

(i) Production of sperm or egg

In male frogs, the testes are responsible for the production of sperm. They appear as whitish, oval bodies near the kidneys. In females, the ovaries produce eggs and are found as lobed structures filled with black or brownish eggs.

(ii) Temporary storage of gametes

In males, the sperm may be temporarily stored in the sperm ducts or vas deferens before being released. In females, the eggs may accumulate in the ovisac before oviposition.

(iii) Transportation of gametes

In males, the vas deferens (also known as sperm duct) transports sperm from the testes to the cloaca. In females, the oviduct transports eggs from the ovary to the cloaca for fertilization or release.

(c) What would happen if the anterior abdominal vein is accidentally punctured during dissection?

Puncturing the anterior abdominal vein would result in excessive bleeding within the body cavity, which may obscure visibility of internal organs and make it difficult to identify specific structures. It could also result in loss of valuable observational time and compromise the safety of the dissection environment.

(d) State two reasons why water is poured into the body cavity during the dissection.

Pouring water into the cavity helps prevent the internal organs from drying up, especially during prolonged dissection sessions. This keeps the tissues moist and close to their natural state.

It also helps in gently displacing the internal organs, making it easier to identify and separate structures for observation without damaging them.

2. You are provided with solution K. Perform the following biochemical tests:

(a) Using the given reagents, test the solution for food substances and record your results in the table:

Food Tested	***Procedure***	***Observation***	***Inference***
Starch	Add iodine solution	Blue-black colour observed	Starch is present
Reducing sugar	Add Benedict's solution and heat	Brick-red precipitate formed	Reducing sugar present
Protein	Add Biuret solution	Purple colour observed	Protein is present
Lipid	Rub on brown paper and heat	Permanent translucent spot formed	Lipid is present

(b) Mention two natural food sources from which solution K could have been extracted.

Solution K could have been extracted from milk, which contains proteins, lipids, and lactose (a reducing sugar).

It could also be from groundnut extract, which contains proteins, fats, and some carbohydrates.

(c) State the first site of digestion, digestive juice, and end product of the identified food substance in solution K.

The first site of digestion for carbohydrates is the mouth, where saliva containing salivary amylase starts breaking down starch into maltose.

Proteins begin digestion in the stomach where gastric juice containing pepsin digests them into peptides.

Lipids begin digestion in the small intestine with the aid of bile and pancreatic lipase, resulting in fatty acids and glycerol.

3. Observe specimens W (Ant), X (Butterfly), Y (Beetle), Z (Mushroom), and AA (Bean plant). Answer the following:

(a) Mention four observable differences between specimen W and X.

The ant has elbowed antennae, while the butterfly has clubbed antennae at the tip.

Ants have a hard exoskeleton and a narrow waist between thorax and abdomen, whereas butterflies have broader bodies and no narrow waist.

Wings in ants are either absent or transparent with equal size when present, while butterflies have large, colorful, scaled wings.

The movement of ants is crawling with segmented walking legs, while butterflies primarily fly using their broad wings.

(b) Mention four observable differences between specimens Z and AA.

Mushroom (Z) lacks chlorophyll, while the bean plant (AA) has green leaves with chlorophyll for photosynthesis.

Z grows from spore-producing bodies, while AA grows from seeds with defined root, stem, and leaves.

Specimen Z has a fruiting body with cap and stalk, while AA has compound leaves and branching stem.

Z lacks vascular tissues, while AA has well-developed xylem and phloem for water and nutrient transport.

(c) Draw specimen Z and label four visible structures.